APRIL, 1924

ENTOMOLOGICAL NEWS

Vol. XXXV No. 4

GEORGE HENRY HORN
1840–1897

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PHILADELPHIA, PA.
THE ACADEMY OF NATURAL SCIENCES,
Logan Square

Entered at the Philadelphia, Pa., Post Office as Second Class Matter.
Acceptance for mailing at the special rate of postage prescribed for in Section 1103,
Act of October 3, 1917, authorized January 18, 1921.

ENTOMOLOGICAL NEWS

published monthly, excepting August and September, in charge of the Entomological Section of The Academy of Natural Sciences, Philadelphia, and The American Entomological Society.

ANNUAL SUBSCRIPTION, $2.50 IN ADVANCE
FOREIGN SUBSCRIPTIONS, $2.70 IN ADVANCE
SINGLE COPIES 30 CENTS

ADVERTISING RATES: Full width of page. Payments in advance.

One issue,	1 in.,	$ 1.20,	2 in.,	$ 2.40,	half page,	$ 4.00,	full page,,	$ 8.00
Five issues,	"	5.50,	"	11.00,	"	17.50,	"	35.00
Ten issues	"	11.00,	"	20.00,	"	35.00,	"	70.00

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STATED MEETINGS

Of the Entomological Section of The Academy of Natural Sciences of Philadelphia, and of The American Entomological Society will be held at 7.30 o'clock P. M. on the following dates during 1924: January 24, February 28, March 27, April 24, May 22, September 25, October 23, November 20, and Dec. 8.

Communications on observations made in the course of your studies are solicited; also exhibits of any specimens you consider of interest.

The printer of the NEWS will furnish reprints of articles over and above the twenty-five given free at the following rates: One or two pages, twenty-five copies, 35 cents; three or four pages, twenty-five copies, 70 cents; five to eight pages, twenty-five copies, $1.40; nine to twelve pages, twenty-five copies, $2.00; each half-tone plate, twenty-five copies, 30 cents; each plate of line cuts, twenty-five copies, 25 cents; greater numbers of copies will be at the corresponding multiples of these rates.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA

VOL. XXXV APRIL, 1924 No. 4

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The Life-History of Brephidium exilis Bdv. (Lepid.: Lycaenidae).

By KARL R. COOLIDGE, Hollywood, California.

Brephidium exilis Bdv., well named "The Pygmy Blue," since it is one of the smallest species of butterflies in the world, is the most abundant form of Rhopalocera in Southern California. Along the coastal region it flies in countless millions, is well distributed throughout the Mohave and Colorado Deserts, but does not invade the higher mountains to any great extent. Some idea of its abundance can be gleaned by the fact that from one patch of Australian saltbush, hardly several acres in extent, half a million perfect specimens were taken in a few weeks' time—and yet this considerable number did not diminish the status of the colony to any noticeable degree.

Wright (Butt. West Coast) was in error in stating that *exilis* in California does not occur north of Santa Barbara, since it is very common in the San Joaquin Valley as far north as Sacramento, and simply swarms in the salt marshes about San Francisco Bay.

About Los Angeles I have seen it on the wing every month of the year, but as a rule it does not appear in numbers until early July, reaching the apex of the season's flight in the hot days of September, and from the middle of November, or earlier according to the coolness of the season, rapidly diminishing.

It is severely parasitized by a Tachinid fly, specifically unidentified as yet, and the amazing thing about *exilis* here is its continued abundance in view of the vast numbers of larvae that fall victims to the parasite. As an example, on one occasion twenty-eight larvae were collected. Of these eleven were found to already contain the parasitic grub internally, its black head readily being seen laterally on thoracic segment three, or abdominal one, generally on the left side, only rarely on the right. Four others bore parasitic eggs, making a total of fifteen out of twenty-eight. In another instance fourteen larvae out of eighteen were found to be parasitized.

The parasitic egg is usually placed on one of the anterior segments, more frequently on the first or second thoracic than elsewhere. It may be briefly described as: Egg shaped, pale yellowish white, with a very delicate scarcely raised tracery of round cells, .01 mm. in diameter. Length .34 mm.; .14 mm. in diameter at the smaller end; .32 mm. at the larger end.

I once witnessed an encounter between the parasitic fly and a larva in the fourth instar. The larva was being attended by several ants when the fly alighted on the same leaf. The ants immediately became greatly excited, and as the fly endeavored to get into a position to place an egg, the ants scurried back and forth over the larva at a frenzied rate of speed. It did not appear that the ants were deliberately seeking to attack the fly, but by the hurried scamperings over the larva they soon discouraged the parasite, which after three or four fruitless attempts to oviposit flew away. The impression I received was that the ants were assuredly aware of the danger to their larva, and were certainly responsible for its being saved.

The eggs are placed everywhere on the food-plants, but more frequently on the upper surfaces of the leaves than elsewhere. Of forty-six eggs, thirty-four were on the upper sides

of the leaves, eight on the under surfaces, two on the stems, and two on the seed pods.

I have discovered eggs or larvae on the following food-plants:

Chenopodiaceae.

Atriplex semibaccata R. Br. Australian saltbush, introduced in California about thirty years ago as a forage plant, and which has now completely established itself. This is the favorite food-plant.

Atriplex coulteri Dietr. At Santa Catalina Island.

Atriplex serena Nelson. (*bracteosa* Wats.) Lamb's Tongue, a common weed in saline places.

Atriplex canescens (Pursh.) James. Shad-bush. On the Mohave and Colorado Deserts.

Atriplex leucophylla Sietr. Along the seashore.

Atriplex breweri Wats. A popular low hedge in Southern California.

Atriplex patula L. With *A. hastata* L., the food-plants in the San Francisco Bay region.

Chenopodium leptophyllum Nutt. A common weed in waste places. Also *C. album* L., Lamb's Quarters, a native of the Old World, but now a familiar weed in the settled parts of California.

Solanaceae.

Petunia parviflora (Lehm.) Juss. Petunia, a plant growing on margins of ponds and along streams, especially in subsaline places. I found *exilis* swarming about this at Buena Vista Lake, in Kern County.

The young larva eats its way out of the egg through a jagged hole, usually in the side, and only devours sufficient of the shell to make its exit. In the earlier stages the larvae prefer the young buds, but also eat out irregular roundish holes in the leaves. Later, they attack mainly the seed-pods, boring into them and eating out the inner contents. Pupation takes place in debris or under stones, and hibernation occurs in the pupal state.

Eggs laid July 11th.
Hatched July 14th.
Passed first moult July 18th.
Passed second moult July 22nd.
Passed third moult July 26th.
Passed fourth moult August 1st.
Pupated August 6th.
Imagoes emerged August 10th.

The Egg.—Turban-shaped, more than half as high as broad, the upper portion almost perfectly flat, sloping evenly to the central depression, the micropyle; the sides strongly convex to

the flattened base. The micropyle in a deep even round pit, .02 mm. in diameter, of a deeper green than rest of egg.

Ground color a very delicate bluish green, with the usual raised net-work white; as the embryo develops the greenish coloration becomes lost, the egg becoming a solid chalky white. The raised network on the sides divides itself into irregular subtriangular and subquadrate cells, measuring .02 mm. in their longest axes, with the cell walls .005 mm. in thickness; the usual protuberances at the angles .01 mm. in height and .015 mm. in thickness, broadly rounded. About the micropyle the net-work becomes confused, more irregular and the cells are much smaller. Base sharply flattened, of a deeper tint of green, marked by a delicate tracery of quite regular pentagonal cells. Diameter .44 mm. Height .20 mm.

First Instar.—Head dark chestnut brown, shining, .14 mm. in diameter. First thoracic segment pallid, with a bluish tinting.

Body finely granulated. The usual Lycaenid triangular chitinous dorsal plates with a white sheen. Series of rather high conical papillae, projecting hairs, in the following arrangement:

A suprastigmatal series, placed anteriorly on the segments, one to a segment on either side, projecting minute, crooked, clavate, densely spiculiferous hairs, .015 mm. in length. A second similar set of suprastigmatals above these, one on each side, and centrally located.

Two substigmatal papillae, an anterior with the projected hair .02 mm. in length, clubbed, crooked, densely spiculiferous; and a much larger one placed considerably below and centrally on the segment, with the hair .08 mm. in length, straight, sharp, and colorless.

A subdorsal row, one to a segment, placed centrally; the hairs from these colorless, clubbed, spiculiferous, .08 mm. in length, .009 mm. in width at the base and .01 mm. in width at the tip; these hairs closely appressed and directed caudad and slightly laterad, except on the first thoracic where they project over the head. The papillae emitting these hairs .01 mm. in height and diameter, and those of the first thoracic are dark brown.

Color of body pale lemon yellow, but as the larva feeds the original yellow coloration fades more and more, with a greenish tinge taking its place, until at the end of the instar the larva is a solid pale delicate green. Ventral surface and prolegs bright lemon yellow, at beginning of stage. Spiracles pallid, round, with a very fine brown ring, .01 mm. in diameter. A laterodorsal row of naked fuscous lenticles, two to a segment on either side, close together, the outer the smaller. Anal segment

with a fringe of minute fuscous papillae that project fine, sharp, colorless spiculiferous hairs posteriorly, these being .11 mm. in length.

Length, at birth, .66 mm. Width at first thoracic segment, .20 mm. Width at anal segment .16 mm.

Second Instar.—Head dark chestnut brown, shining, .26 mm. in diameter. As before, first thoracic pallid, with a bluish tinting.

Body densely studded with dark brown tubercles projecting heavy, short, curved, densely spiculiferous hairs, clavate; these tubercles .007 mm. in height and diameter, with the arising hairs .02 mm. in height and width at the tip, but the hairs vary slightly, some being as long as .04 mm. Long, sharp, colorless hairs bordering anal segment posteriorly now .16 mm. in length on the average. On first thoracic some similar anteriorly projecting hairs, some .16 mm. in length, others but half that size. Some fine, sharp, straight hairs, colorless, .06 mm. in length, on ventral surface along base of prolegs.

Color of body pale green, excessively finely granulated with brownish atoms. Ventral surface and prolegs pale yellow green. Legs pale yellow brown, opaque. Spiracles pallid, round, .02 mm. in diameter, with a fine brown ring.

Length, 1.40 mm. Width at first thoracic .40 mm. Width at anal segment .34 mm.

Third Instar.—Head dark chestnut brown, shining, .34 mm. in diameter. As before, first thoracic pallid, with a bluish tinge.

Body densely studded with tubercles as before; these are mostly concolorous with the body, but some, irregularly scattered, are conspicuously dark brown. The arising hairs colorless and clavate, averaging .04 mm. in height and .02 mm. in diameter at their tips. First thoracic with a fringe of sharp, colorless hairs projecting over the head and a similar but posteriorly projecting fringe to the anal segment; these hairs are as long as .16 mm., with some shorter ones down to .08 mm.

Color of body green to gray green, with the surface finely granulated with brownish atoms. Ventral surface and prolegs pale yellowish green. Legs pale yellow brown, opaque. Spiracles round, with a fine brown ring, .025 mm. in diameter.

Length, 2.30 mm. Width at first thoracic .70 mm. Width at anal segment .54 mm.

Fourth Instar.—Head .44 mm. in diameter, dark chestnut brown, shining. Neck bluish green.

Body densely studded with tubercles as before; these are now dark brown, short and stout, .02 mm. in height, and .025 mm. in diameter at base. The arising hairs colorless and clavate, densely spiculiferous, varying slightly in length, but

.03 mm. in length on the average. Anteriorly projecting, colorless spiculiferous hairs of first thoracic now from .06 to .20 mm. in length. Anal segment spatulate, moderately depressed, with a fringe of colorless, spiculiferous hairs averaging .20 mm. in length.

Color of body light green, but for the various phases that may exist see under mature larva. The flattened, dorsal, triangular processes pale yellowish brown, mottled with rosaceous, and in the center of each, so as to form a broken yet conspicuous dorsal line, a heavy blotching of rosaceous. Or, these subtriangular processes may be quite pallid, with the dorsal, rosaceous line only faintly present. Anal segment usually with a rather heavy blotching of rosaceous dorsally and substigmatally. Ventral surface and prolegs bright blue green. Legs pale yellow brown. Spiracles round, pallid, with a fine brown ring, .03 mm. in diameter. Tubes and sac conspicuous, the tube cases pallid, .1 mm. in diameter, prominent, elevated to a height of .12 mm.

Length 3.9 mm. Width at first thoracic 1.04 mm. Width at anal segment .90 mm.

Fifth Instar.—Head .60 mm. in diameter, now a rather dull brown.

As before, body densely studded with dark brown tubercles, .025 mm. in height, giving rise to white, densely spiculiferous, crooked processes, for most part bent anteriorly. These average .04 mm. in length. Some of the basic tubercles, especially in the dorsal region, are pure white. First thoracic with a heavy fringe of colorless, spiculiferous hairs, averaging .22 mm. in length, mounted on dark brown papillae .03 mm. in height and diameter. A similar fringe of hairs, of the same length, to the anal segment. Segmental incisures deep. Surface of body finely punctate. Spiracles round, pallid, .05 mm. in diameter, surrounded by a narrow brown ring.

Color yellowish green. A bright yellow, substigmatal band, only weakly indicated, sometimes obsolete. A yellowish white, dorsal line, with a more or less pinkish tinge, not prominent, extending from the second thoracic and fading out on the anal segment. The above is the commonest coloration phase, with others as follows:

A greenish phase, with weak roseate dorsal line and no substigmatal rosaceous or yellowish line.

A greenish phase with roseate dorsal and roseate substigmatal bands well developed.

A greenish phase with dorsal line dark green and bordered by a yellowish tinge. No rosaceous either dorsally or substigmatally.

A greenish phase with roseate dorsal line well developed, but roseate substigmatal line only faintly indicated.

A dark green phase, devoid of either yellowish or rosaceous anywhere.

Prolegs and ventral surface green. Legs pale yellow brown.

Length, at maturity, 7 mm. Width at first thoracic 2 mm. Width at anal segment 1.8 mm.

The Pupa.—Viewed dorsally, the sides quite straight to the middle of the abdomen, swelling out only very slightly, so that the greatest breadth is at the point where a rather sudden slope begins to the well rounded, posterior abdominal segment. Viewed laterally, the thorax is highest in the middle of posterior half of mesothorax. Abdomen highest at third segment, slightly higher than the highest point of thorax.

Color light brownish yellow, of varying depths; rarely, the pupa may be a solid pale grass green. A fuscous dorsal line of varying depths and intensity, sometimes quite strong and conspicuous, again weak and broken; this, on the abdominal segments, is often pale red brown. Wing cases pale yellowish green, infuscated with some brownish dots. An abdominal, subdorsal row of rather prominent dark brown dots, quadrate or round, sometimes very heavy. On the thorax these are replaced by two concolorous streaks, projecting outward, and joined together at their furthest points.

Surface of body almost smooth, only exceedingly finely broken by a whitish tracery of scarcely raised lines. A few, minute, fuscous papillae giving rise to colorless hairs which enlarge as they proceed apically and at the extreme summit are expanded into bulbous heads. These hairs most numerous on the abdominal segments, .005 mm. in width at their bases, and though they vary slightly in height the average is .025 mm. Spiracles white, .06 mm. in length.

Length 5.5 mm. to 6 mm. Greatest breadth of abdomen 2 mm.

An Annotated List of the Ants of Mississippi (Hym).

By M. R. SMITH, A. and M. College, Mississippi.

(Continued from page 85.)

Subfamily CAMPONOTINAE.

54.—**Prenolepis imparis** Say.

Holly Springs; A. and M. College; Yazoo City. This species builds its nests in clay-like soils where there is an abundance of moisture. Very characteristic earthen pellets are distributed around the nest's entrance. The workers are very fond of honey dew and are often found in attendance on insects which

excrete this substance. The writer has often seen workers whose gasters were so distended from feeding on honey dew that they were almost unable to walk. Some of the workers act as storehouses for their sisters, during periods when food is scarce, and are known as repletes. This species often enters houses in its search for food.

P. imparis may be distinguished from the other species of *Prenolepis* here mentioned by its larger size and by its pronounced more or less cylindrical mesonotum.

55.—**P. (Nylanderia) bruesi** Whlr.

A. and M. College. This is a much smaller species than *imparis*. Nests are built under the bark of logs or stumps, or under stones. The workers are also fond of honey dew.

56.—**P. (Nylanderia) vividula** Nyl.

A. and M. College. This ant is very closely related to *bruesi* and it is almost impossible to distinguish the two unless male forms are present. The genital appendages of the males of the two species are quite distinct showing that these cannot be the same species.

57.—**P. longicornis** Latr.

Gulfport; Biloxi. The workers of this imported species can be recognized by their slender forms and by their exceedingly long legs and antennae. These ants infest houses, stores, cafeterias, etc., but are far from being as troublesome as the Argentine ant, which is the house pest pre-eminent in Mississippi. The workers run very swiftly, darting here and there, as if devoid of any sense of general direction; this term has earned for them the name of "crazy ant."

58.—**Lasius niger** var. **americanus** Emery.

A. and M. College; Lula; Trimcane. The corn, or cotton field ant, as it is generally known, does not seem to be common in Mississippi, although collecting for it has been done in numerous localities in the state. Nests are constructed in the soil or under stones in the open. The workers are given to attending plant lice and their relation to one species, *Aphis-maidi-radicis* has attracted much attention. Because of this peculiar relation the ant is considered of economic importance.

This ant can be separated from the species given below by its much darker color and by the presence of three-jointed maxillary palpi. Workers when crushed have a very strong formic acid odor.

59.—**L. (Acanthomyops) interjectus** Mayr.

A. and M. College. This is the largest ant of the subgenus *Acanthomyops*. Nests are built in the soil under stones or logs. The workers are also fond of attending subterranean plant lice, mealy bugs, etc. The ants seem to shun light and are never seen on the surface unless unearthed or exposed.

L. interjectus can be distinguished from *americanus* by its six-jointed maxillary palpi, its yellow color, its shining appearance and the presence of a peculiar lemon verbena-like odor.

60.—**Formica pallide-fulva** Latr.

Tupelo; A. and M. College. This ant nests in the soil under stones or in the open in fields and pastures, seeming to prefer a clay, or a clay loam soil. The workers are very timid and cowardly and are made slaves of by other species of *Formica*. They feed largely on insects but are also fond of honey dew.

This pale yellow species can be easily separated from the other two forms mentioned under this genus. It differs from the subspecies *schaufussi* in being more slender and less robust and in lacking the hairs on the gular and petiolar borders. *F. subsericeae* is a black species which is densely covered with a silk-like pubescence.

61.—**F. pallide-fulva** subsp. **schaufussi** Mayr.

A. and M. College. The workers of this form have the same habits as those of the species. It is also made slaves of by other species of *Formica*.

62.—**F. fusca subsericeae** Say.

Caesar. This species does not seem to be common in Mississippi, in fact it is much less common than the two preceding species. It has habits similar to those species and is made a slave of by other species of the genus.

63.—**Camponotus castaneus** Latr.

Mt. Olive; Ocean Springs. This large, yellowish, or castaneous colored species lives in the soil under stones in open wood-

lands. The workers are rather timid and probably nocturnal. This species is fond of honey dew but no doubt feeds on insects also.

C. castaneus is easily distinguished from other ants by its large size and by the more or less uniform yellowish or castaneous color of all the various phases.

64.—**C. castaneus** subsp. **americanus** Mayr.

Oakland; Neshoba. This subspecies has the same habits as *castaneus*. The workers can be distinguished from those of the species by the dark colored head, the remainder of the body being a uniform yellowish or castaneous color.

65.—**C. herculeanus** subsp. **pennsylvanicus** DeGeer.

"The carpenter ant" is widely distributed throughout the state and is one of the most common ants in Mississippi. Nests are built in more or less faulty or decayed trees, the ants sometimes simply honey-combing the wood with their galleries and chambers. McCook states that a queen is able to establish a nest and raise her first brood unaided. Workers are very fond of honey dew and are often found in attendance on plant lice, tree hoppers, etc.

The workers of this ant can be recognized by their large form, their black color and by the golden hairs and pubescence on their bodies.

66.—**C. herculeanus** subsp. **pennsylvanicus** var. **ferrugineus** Fabr.

Oakland; Neshoba; A. and M. College. This is a beautiful color variety of *pennsylvanicus* which has similar habits but not quite so wide a distribution. In this variety the workers have the thorax, petiole, coxae, femora, and base of first gastric segment yellowish ferruginous; sometimes the pronotum and the mesonotum are black. The other portions of the body are black, with the exception of the funiculi, mandibles, anterior border of head, tibiae and tarsi which are deep red.

67.—**C. socius** Roger.

Waynesboro; Benoit. This imported South American species has been found at the above named localities in Mississippi. The

writer has seen specimens of this ant in Dr. Wheeler's collections from Florida, Georgia, North Carolina and Alabama. Evidently it is spreading throughout the Southern States, for when Dr. Wheeler published his paper on the ants of the genus *Camponotus* in 1910, this species was then only known from Florida. Nothing is known concerning the nesting and other habits of *socius*.

The major worker has a ferruginous red head, the mandibles and scapes are darker, with the anterior border of clypeus and cheek black. The gaster is black with golden yellow posterior borders to each segment and a broad transverse golden band on the first and another at the base of the second segment. Because of its very distinct coloration one has no difficulty in separating this from any of the other species of *Camponotus* here mentioned.

68.—**C. caryae** Fitch.

This species is widely distributed throughout the state. Nests are constructed under the bark of trees, in twigs, or occasionally, in galls. The nests are rather small and contain very few individuals as compared with nests of other species of *Camponotus*. The workers are very fond of honey dew and may be found crawling over the trees in search of this substance. They are rather timid and hard to capture. *C. caryae* and its various subspecies and varieties are all similar in that the workers have the clypeus cut out, or emarginate in the middle.

The workers are usually shining black, but occasionally some specimens show considerable red on the appendages, the articulation of the joints, etc.

69.—**C. caryae** var. **minutus** Emery.

This is a smaller and paler form of the species. The coloration is highly variable. The habits of the two are the same.

The worker major differs from that of *caryae* in that it is smaller and that it possesses a reddish, or yellowish, thorax and petiole. The legs and antennae are paler and the mandibles, sides and lower surfaces of the head red or brown.

70.—**C. caryae** var. **decipiens** Emery.

Louisville; Starkville; A. and M. College. These ants have

been found nesting in the twigs of fig and white ash, also in galls on oak trees. The workers have reddish yellow heads and thoraces and black abdomens. *Decipiens* bears a close resemblance to *rasilis* in color, but is smaller than this subspecies and has much darker appendages. The gaster is black with pale yellow margins to the segments.

71.—**C. caryae** subsp. **rasilis** Whlr.

Starkville. As stated above, this subspecies bears a close resemblance to the variety *decipiens*, but is larger and of a lighter yellowish red color, without the noticeable infuscation on the legs, antennae and head of the worker. Nests are made in galls or in twigs of trees. Occasionally, the workers invade houses, showing a decided fondness for sweets such as syrup, jams, sugar, etc.

72.—**C. caryae** subsp. **rasilis** var. **pavidus** Whlr.

Starkville; Sibley. Nests of this variety have been found under the bark of a dead oak twig and in the stem of elder. The workers of this variety are similar to those of *rasilis* in the color of the head, thorax, petiole and appendages, but the gaster is yellow at the base. The yellow of the gaster may cover all of two segments or only the base of the first segment.

73.—**C. caryae** var. **pardus** Whlr.

The workers of this variety are small, averaging about 5.5 mm. In color they are very variable, even specimens from the same colony showing a wide variation in this respect. Typical specimens have dark brown, or black heads, with ivory yellow thoraces which are spotted with brown, and the base of the gasters often banded with yellow.

74.—**C. (Colobopsis) impressus** Roger.

A. and M. College. A nest of this species was found in a pecan twig. The ant probably nests in the twigs of other plants also. This and all other forms of the subgenus *Colobopsis* can be distinguished by the truncate head of the soldier form.

C. impressus can be distinguished from the other two species mentioned here by the shape of the soldier's head, the sides of which are distinctly parallel.

75.—**C. (Colobopsis) mississippiensis** Smith.

Tupelo; Starkville; A. and M. College; Sibley. This species has been found nesting in the twigs of white ash and in galls on red oak. It is the most common species of *Colobopsis* in this section of Mississippi. The workers have been observed to feed on honey dew.

C. mississippiensis can be distinguished from *impressus* by the shape of the head of the soldier, the sides being divergent anteriorly; and from *fraxinicola* by the anterior portion of the head being deeply concave and sharply margined, while that of *fraxinicola* is blunt with the clypeus projecting above the general truncated surface.

76.—**C. pylartes** subsp. **fraxinicola** Smith.

A. and M. College; Starkville. This species also nests in the twigs of white ash. It is not as common a species of *Colobopsis* in this locality as *misssissippiensis* but is more common than *impressus*.

Notes on Texas Sarcophagidae (Diptera).

By H. J. REINHARD, Texas Experiment Station,
College Station, Texas.

This paper includes a list of Sarcophagidae collected at College Station and a number of other points in the southern and western sections of the State. More extended collections will undoubtedly bring to light many additional species not listed here. Authentic records on the distribution of the Sarcophagidae within this State are extremely meagre, and the following list is published as a preliminary contribution to the present knowledge of this important family of muscoid flies. Grateful acknowledgment is made to Dr. J. M. Aldrich for making determinations of several species, and to all others who have assisted in collecting material.

CAMPTOPS UNICOLOR Ald. College Station, common, April-October.

CAMPTOPYGA ARISTATA Ald. Houston, abundant, May, 1921.

HYPOPELTA SCROFA Ald. College Station, 4 specimens, March-November, 1921.

STHENOPYGA GLOBOSA Ald. College Station, abundant, April-October.

SARCOPHAGA n. sp. Sonora, 2 specimens, February, 1922 (Dr. D. H. Bennett), Aldrich determination.

S. ACULEATA Ald. College Station, abundant, June-October; Balmorhea, October, 1921, (C. S. Rude).

S. ALCEDO Ald. College Station, 3 specimens, October, 1920, May-July, 1923.

S. AMPULLA Ald. Dallas, April, 1914, (Aldrich) Sarc. and Allies, p. 153.

S. ANGUSTIFRONS Ald. College Station, 2 specimens, October, 1916.

S. ASSIDUA Walk. College Station, very common, March-November.

S. AUSTRALIS Ald. El Paso, 2 specimens, August, 1923, (C. S. Rude); Sonora, February, 1922, (Dr. D. H. Bennett).

S. BISHOPPI Ald. Crystal City, July, 1914, (Aldrich) Sarc. and Allies, p. 260.

S. BULLATA Park. College Station, abundant, April-November.

S. CIMBICIS Tns. College Station, 3 specimens, May, 1919, October, 1921.

S. CISTUDINIS Ald. College Station, 1 specimen, April, 1921.

S. COMMUNIS var. OCHRACEA Ald. College Station, common, April-September.

S. DAVIDSONI Coq. Midland, November, 1914, (Aldrich) Sarc. and Allies, p. 100.

S. FALCULATA Pand. Dallas, (Aldrich) Sarc. and Allies, p. 207.

S. FLAVIPES Ald. College Station, 4 specimens, October, 1920-1.

S. GALEATA Ald. College Station, 1 specimen, October, 1921.

S. HAEMORRHOIDALIS Fall. College Station, common, April-November.

S. HELICIS Tns. College Station, very common, March-November; Balmorhea, October, 1921, (C. S. Rude).

S. HUNTERI Hough. College Station, fairly abundant, May-October; Balmorhea, October, 1921, (C. S. Rude).

S. IMPAR Ald. College Station, common, March-July; Houston, May, 1921.

S. JOHNSONI Ald. Galveston, (Aldrich) Sarc. and Allies, p. 165.

S. KELLYI Ald. College Station, abundant, May-June; Sonora, February, 1922, (Dr. D. H. Bennett).

S. LATISETOSA Park. College Station, 1 specimen, October, 1921; Laredo, Duval County, Marathon, February-May, 1922, (C. S. Rude).

S. MARGINATA Ald. College Station, 2 specimens, May-July, 1923.

S. MELAMPYGA Ald. College Station, abundant, April-June.
S. OPIFERA Coq. College Station, 3 specimens, May-July, 1917, November, 1919.
S. PACHYPROCTA Park. Laredo, 1 specimen, May, 1922, (C. S. Rude).
S. PECTINATA Ald. College Station, fairly abundant, April-November.
S. PELTATA Ald. College Station, 1 female, June, 1919, referred here doubtfully by Dr. R. R. Parker.
S. QUADRISETOSA Coq. College Station, common, April-November; Houston, May, 1921; Kirbyville, July, 1922, (C. S. Rude).
S. ROBUSTA Ald. College Station, abundant, April-November; Sonora, August-October, (Dr. D. H. Bennett).
S. RUDIS Ald. College Station, 1 specimen, May, 1922.
S. RUFIVENTRIS Wied. College Station, abundant, June-November.
S. SALVA Ald. College Station, common, May-November.
S. TUBEROSA var. SARRACENIOIDES Ald. College Station, very common, April-September.
S. SINGULARIS Ald. College Station, 2 specimens, October, 1920, April, 1922.
S. SULCULATA Ald. Balmorhea, 1 specimen, October, 1921, (C. S. Rude); Sonora, October, 1920, (Dr. D. H. Bennett).
S. TEXANA Ald. Dilley, 1 specimen, May, 1920.
S. UTILIS Ald. College Station, abundant, April-October.
S. XANTHOPYGA v. d. W. College Station, common, July-October. Assigned here doubtfully since this determination by Coquillett has not been verified by comparison with the type.

Notes on the Judas Tree Leafhopper, Erythroneura aclys McAtee in New Jersey (Homop.).

By HARRY B. WEISS and ERDMAN WEST,
New Brunswick, New Jersey.

This species* was noted at Kingston, New Jersey, on August 10, at which time thousands of adults, many first, second and third stage nymphs and a few fourth and fifth stages were infesting a specimen of Judas tree or red-bud (*Cercis canadensis* L.) growing on the front lawn of a householder. Nearly

*Identified by Mr. C. E. Olsen.

every leaf on the tree was white from the combined attacks of the nymphs and adults and an adjacent specimen of the mist tree also showed some injury presumably from adults which were present. At this date a brood of adults was well under way and many eggs were found. The eggs were placed anywhere just under the tissue of the lower leaf surface, but usually close to a mid or side vein. There appeared to be no regularity in their deposition and many were found between the veins, near the leaf base, edges, etc. Each egg showed as a little oblong, slightly curved, greenish swelling or blister on the lower surface. After hatching the blisters collapse and the tissue turns brown at the spot occupied by the egg.

The nymphs inhabit the lower leaf surfaces, feeding singly or in loose colonies of many individuals. On August 23, the infested tree was visited again and many adults were found but comparatively few nymphs. On September 19, the number of adults had decreased and only a few last stage nymphs remained. At this date many adults were found resting on the trunk of the tree and several were found under loose bark. It is supposed, therefore, that the species hibernates as an adult. On October 10, fewer adults were found on the leaves, no nymphs remained and several adults were noted again under loose bark. The following descriptions indicate the development which takes place from egg to adult.

Egg. Length 0.52 mm. Width 0.15 mm. Whitish, translucent, subcylindrical, broadly rounded at both ends, egg slightly curved when viewed laterally.

First Nymphal Stage. Width of head including eyes 0.18 mm. Length about 0.8 mm. Whitish, form narrow, elongate. Head triangular, broadly rounded, almost truncate anteriorly. Anterior truncated portion bearing several fine hairs. Eyes prominent, lateral, red, consisting of numerous, distinct ommatidia. Antennae whitish, about three-fourths as long as body; first segment short, subcylindrical, second segment subcylindrical, slightly longer than first, third segment very long, whip-like, swollen at base and tapering to a fine point. Thorax as broad as head excluding eyes, sides subparallel. Prothorax and mesothorax subequal in length. Metathorax slightly less in length. Slight constriction between thorax and abdomen. Second abdominal segment widest, remainder gradually taper-

ing to anal segment which is acutely pointed or tube-like. Legs whitish, comparatively long. Rostrum reaching almost to third pair of legs.

Second Nymphal Stage. Width of head including eyes 0.26 mm. Length about 1.1 mm. Whitish with lemon-yellow tinge; form narrow, elongate. Head triangular, broadly rounded or truncate anteriorly, anterior edge bearing two fine setae. Eyes prominent, lateral. Prothorax as broad or slightly broader than head excluding eyes and slightly longer than mesothorax. Meso- and metathorax similar in shape and slightly wider than prothorax; anterior and posterior edges broadly curved. Meso- and metathorax each subcrescent-shaped with rounded points of crescents extending posteriorly. Constriction between thorax and abdomen more pronounced. Abdomen broadest at second or third segment, gradually tapering to an acute point at ultimate segment. Abdominal segments for the most part subequal in length. Legs long, narrow. Antennae about two-thirds as long as body. Rostrum reaching to between the second and third pair of legs.

Third Nymphal Stage. Width of head including eyes 0.31 mm. Length about 1.5 mm. Similar in shape and color to preceding stage. Constriction between thorax and abdomen very pronounced. Antennae about one-half as long as the body. Posterior extensions of mesothorax and metathorax quite pronounced, those of mesothorax subparallel or slightly diverging and those of metathorax widely diverging, the ends extending slightly beyond the extensions of the mesothorax.

Fourth Nymphal Stage. Width of head including eyes 0.41 mm. Length about 1.8 mm. Similar in shape and color to preceding stage except that extensions of mesothorax and metathorax have developed into pronounced wing pads; those of mesothorax slightly subparallel or slightly divergent and those of metathorax widely divergent or extending considerably beyond the body line. Antennae less than one-half as long as body. Rostrum extending to between the second pair of legs.

Fifth Nymphal Stage. Width of head including eyes 0.51 mm. Length about 2.4 mm. Whitish with lemon-yellow tinge; form narrow, elongate gradually tapering posteriorly. Antennae white, about one-third as long as body, three-segmented, first segment short, cylindrical, second segment slightly longer than first, third segment whip-like, very long, swollen at base and tapering to a fine point. Head triangular, broadly rounded anteriorly and bearing two setae on anterior margin and several smaller setae between the marginal setae and the antennae. Eyes prominent, lateral. Prothorax slightly narrower than the

width of head including eyes, sides parallel, length slightly less than one-half width. Mesothorax slightly longer than prothorax, wing pads long and narrow extending beyond body line laterally and posteriorly to slightly beyond the middle of the third abdominal segment. Metathorax slightly less than one-half as long as mesothorax, with narrow wing pads extending laterally beyond the body line and posteriorly to the beginning of the fourth abdominal segment. Abdomen widest at about the third segment and gradually tapering to posterior end. Segments subequal in length except the first, which is shorter, and the last one, which is longer. Last segment bearing several hairs which are short. Legs long, narrow, tibiae bearing minute, short spines which are most pronounced on the third pair of legs. Tip of rostrum extending to the second pair of legs.

Adult. This was described by McAtee from specimens collected at Plummer's Island, Maryland, December 21, 1913 (Trans. Amer. Ent. Soc. xlvi, p. 290, 1920). In past years Mr. E. L. Dickerson has collected this species on Judas trees in several nurseries in the north-eastern part of New Jersey.

Two Little Known Leaf-miners of Apple (Lepid.: Tineidae; Col.: Curculionidae).

S. W. Frost, State College, Pennsylvania.

There are two species of leaf-miners on apple which have received little attention in literature. One of these belongs to the order Lepidoptera, the other to the Coleoptera:. The habits of these have been referred to only briefly. Both are pests on apple, working chiefly on the water sprouts and more succulent growth.

Lyonetia speculella Clem.

Lyonetia speculella Clem.[1] is the more interesting of the two, differing considerably in habits from the numerous other leaf-miners which are more common on apple. The only record of food plants is that of Busck (1904)[2] where he states that a series of specimens was bred by Dr. Dyar at Kaslo, British Columbia from *Ceanothus, Prunus* and *Betula.* Engel (1908)[3]

[1] Syn. *L. nidificansella* Pack., *gracilella* Cham., *apicistrigella* Cham. The determination of the species was kindly made by Miss Annette Braun.

records the species as rare in the woods in the vicinity of Pittsburgh, Pa. The writer has found the small miner abundant in Eastern Pennsylvania during recent years.

The larvae confine themselves to the leaves where they mine during their entire larval stage. They make small irregular blotch mines on the upper surface of the leaf which are slightly visible from the lower surface. Five or six of these mines may be found on the same leaf. The mature dried mines distort the leaf considerably.

The larvae are cream in color, distinctly constricted between the segments. The head is slightly depressed with the front triangle not extending to the vertical triangle. The thoracic legs are present, the pro-legs are rudimentary and represented on the third, fourth, fifth and sixth abdominal segments by a uniserial circle of crochets.

The full-grown larva abandons the mine and pupates in a delicate white silken cocoon fastened by means of a few silken threads to the under side of the leaf. The pupa is light brown in color and superficially resembles the pupa of *Ornix geminatella* Pack., which also mines the leaves of apple. The antennae project considerably beyond the tip of the abdomen. The anterior end of the pupa is prolonged into two sharp horns.

Several adults were reared. These issued from August 18th to August 25th. The moths are beautiful silvery white in color with a dark spot at the tip of each fore-wing. Miss Braun states that the writer's specimens are unusually light in color and that they are usually well suffused with fuscous.

Lyonetia is apparently a leaf-mining genus. The habits of the known species bear this out. Meyrick (1895)[4] speaking of the genus says "larva mining in leaves of trees and shrubs. Pupa in an elongate white cocoon suspended by threads from its ends." Packard (1874)[5] described *Lyonetia saccatella,* feeding from a case rather than mining the leaves. This species, however, was subsequently transferred to the genus *Coptodisca* and made a synonym of *splendoriferella* Clem. The habits of four other species of *Lyonetia* are well known. Two of these occur in Europe; *L. clerkella* L., mining *Betula alba, Prunus cerasus, Pyrus, Crataegus* and *Sorbus,* and *L. prunifoliella*

Walsh., mining *Betula* and *Crataegus*, while two occur in America; *L. latestrigella* Walsh. and *L. candida* Braun. which have been bred as miners on the leaves of *Rhododendron*.

The Apple Flea-weevil, **Orchestes pallicornis** Say.

This small Curculionid has been found at times as abundant as the foregoing species. It was first recorded by Forbes (1911)[6] from Illinois as a pest on apple, cherry and other plants. Blatchley and Leng (1916)[7] give the distribution as ranging from Nova Scotia and Quebec through New England to Oregon and South to Texas. In the state collection at Harrisburg, Pennsylvania, there is a long series of specimens from Pine Grove and Hummelstown, Pa., (Knull), Lakehurst and New Brunswick, New Jersey, (Knull), Laurel Springs, N. J., (Daecke), Delaware, Ohio, (Houser) and Chillicothe, Ohio, (Guyton).

The larvae mine the leaves of apple, cherry, elm and alder. Each larva makes a separate mine which is at first linear but later takes the form of an irregular blotch. The full-grown larva transforms in a gall-like pocket within the leaf. The adults feed on the foliage eating out small holes. They resemble flea-beetles more than Curculionids because their hind legs are enlarged and they are powerful jumpers. Records have been made of the adults feeding on the flowers of *Amelanchier* and the leaves of willow.

According to Blatchley and Leng (1916),[7] most of the species of the genus *Orchestes* are miners in the leaves of willow. The habits of another species *Orchestes rufipes* Lec., are well-known, the larvae mining the leaves of *Salix lucida* and *Salix pentandra*. There are two species in Sweden *O. populi* L. and *O. fagi* L., both miners on poplar. It is very probable that all the species of this genus are leaf-miners.

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[6] Forbes, S. A. Twenty-sixth Rep. Nox. Ins. Ill. :83, 1911.
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Rearing Records of Pollenia rudis Fab. (Dipt., : Muscidae).[1]

By G. L. GARRISON, Bureau of Entomology, Washington, D. C.

The larva of *Pollenia rudis*, Fab., was discovered by Keilin[2] in 1908 and found parasitic on the earthworms, *Allolobophora chlorotica* and *A. rosea*. In Paris he found that eggs were deposited during August or early September on the soil. They hatched after five to seven days and the larva, when it found an earthworm, gained entrance to the body through the male genital opening located on the ventral side of the 15th segment. From September or October to the following May or June the *Pollenia* larvæ were found in a dormant state in the body cavity of the genital segments, i.e. from the 9th to the 12th or even as far back as the 16th. In May or June the larva became active, worked it way toward the anterior end of the worm, where it pierced with its posterior end the prostomium of the worm and thus exposed its stigmata. It continued to feed and gradually destroyed the worm, working backward as fast as the segments were destroyed. Pupation occurred usually from the 5th to the 25th of June, and the pupal stage had a duration of from 32 to 45 days, emergence occurring from the middle of July to the first part of August.

He found only one generation per annum, but admits the possibility of the existence of a summer generation.

The larva of *Pollenia rudis* was found in this country by Webb in June, 1916. Webb and Hutchison determined that the life history of this fly in Washington is quite different from that found by Keilin in Paris[3]. They found no indications of a dormant period during which the larvæ remain practically motionless in the body cavity of the worm.

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[1]This work was conducted under the supervision of Mr. J. L. Webb.

[2]Keilin, D. "Recherches sur les larves de Dipteres Cyclorhaphes," Bul. Sci. de la France et de la Belgique, T. XLIX, 7e Serie, 30th. Dec., 1915.

[3]A Preliminary Note on the Bionomics of Pollenia Rudis, Fabr., in America. Proc. Ent. Soc. of Washington, Vol. XVIII, No. 3, pp. 197-199, 1916.

Their record of summer generations indicate the following developmental periods.

Egg stage	3 days
Larval stages	13-22 "
Pupal stages	11-14 "

Total developmental period 27-39 days and the tentative conclusion was reached that there are four broods or generations in the latitude of Washington, D. C.

Further work was started at Drummond, Maryland, during the Spring of 1922 by the writer to obtain additional information along these lines but flies were not caught in sufficient numbers to work with until late in the season.

The cages used were 16 inches high by 12 inches square. The top, door and three sides were covered with fine mesh screen wire while the framework was of zinc. They were kept on the shelves of a screened insectary and were protected from the direct rays of the sun, while being under conditions as near those of outdoors as possible.

Pollenia caught in traps baited with banana were released in cages with a cigar box containing a small amount of soil, which was kept slightly moistened throughout the time of observation, and a piece of banana for food. As soon as eggs were found all flies were removed and a known number of earthworms, *Helodrilus* (*Allolobophora*) *chloroticus*, free from parasitism, were placed on the soil and daily watch kept for emergence. The following tables give the result of these experiments:

EMERGENCE FROM CAGE 1, LOT 2

Date Eggs found	No. eggs	No. worms introd'c'd	Date emerged	♂	♀	Total	No. days egg to adult emerg.
Aug. 30-31	30	30	Oct. 3	1	0	1	34
Aug. 30-31	30	30	Oct. 4	1	0	1	35
Aug. 30-31	30	30	Oct. 7	1	0	1	38

EMERGENCE FROM CAGE 2, LOT 2

Date Eggs found	No. eggs	No. worms introd'c'd	Date emerged	♂	♀	Total	No. days egg to adult emerg.
Sept. 1-2	15	15	Oct. 7	1	0	1	36
Sept. 1-2	15	15	Oct. 9	2	2	4	38

EMERGENCE FROM CAGE 3, LOT 1

Date Eggs found	No. eggs	No. worms introd'c'd	Date emerged	♂	♀	Total	No. days egg to adult emerg.
July 13	20	20	Aug. 10	0	1	1	28

Experiment 1.

On August 18, A.M., a petri dish containing a small amount of moist soil was placed in a cage with 5 ♂ and 5 ♀ *Pollenia*. As soon as eggs were found worms were placed with them. The following table gives the result of this experiment:

Date Eggs found	No. eggs	No. worms introd'c'd	Parasitic worm found	Larva had entered soil	Remarks
Aug. 21	25	10	Aug. 29	Sept. 9	Did not emerge
			Aug. 30	——	Worm soon died
			Aug. 30	——	Worm soon died
			Aug. 31	——	Worm soon died

Experiment 2.

From September 2 to September 5, 9 male and 29 female *Pollenia* were released in this cage with a small box of moist soil and banana for food. On September 6 there were 2 males and 9 females alive in cage when 30 eggs were found and 15 worms placed with them. Seven days later at the first examination of worms, one was found parasitised but 3 days later it had dried up and larva was not seen again.

Experiment 4.

Date Eggs found	No. eggs	No. worms introd'c'd	Parasitic worm found	Larva had entered soil	♂ Pollenia had emerged
Sept. 8	27	10	Sept. 14	Sept. 25	Oct. 21

Twenty-seven eggs were found in this experiment one day after 3 male and 20 female *Pollenia* were released in cage. Six days later, at the first examination, one parasitised worm was found. Eleven days from this time larva had entered soil, and 26 days from the time it had entered soil 1 male *Pollenia* had emerged.

Experiment 6.

On September 12, 4 male and 18 female *Pollenia* were released in a cage with a tin salve box of moist soil, and banana for food. One day later 40 eggs were found and 15 earthworms placed with them. Seven days from the time eggs were found, at the first examination, 3 parasitised worms were found. Thirteen days from the time eggs were found the fourth parasitised worm was found. No emergence from this lot.

In all cases the eggs were laid singly and partly hidden in the soil.

The larvæ were found in different parts of the body of the worm and do not appear to be confined to any particular point.

Trapping Pollenia rudis.

On June 6, a fly trap baited with bananas was placed in the open field and on June 27 a second trap was put in operation. Beginning June 26 collections were made early each morning, when the flies were stupefied with chloroform and removed from the traps. It was found that more flies were caught when the trap was raised about 8 inches from the ground.

The first *Pollenia* were removed from the trap on June 10 at the second collection.

In July 277 *Pollenia* were caught in both traps or 117 ♂ and 160 ♀. The highest catch, 39, was on July 5th.

In August 314 *Pollenia* were caught; 190 ♂ and 124 ♀. Largest catch 137, August 26-27, Saturday and Sunday collection.

In September 368 *Pollenia* were caught; 151 ♂ and 217 ♀. Largest catch, 77, September 9-10, Saturday and Sunday collection.

In October 938 *Pollenia* were caught; 473 ♂ and 465 ♀. Largest catch, 120, September 10.

In November 1026 *Pollenia* were caught; 494 ♂ and 532 ♀. Largest catch, 280, November 11-12, Saturday and Sunday collection.

TOTALS OF *POLLENIA* CAUGHT BY MONTHS

Month	♂	♀	♂ and ♀
July	117	160	277
August	190	124	314
September	151	217	368
October	473	465	938
November	494	532	1026
Season	1425	1498	2923

A New Species of Anomala (Coleop. Scarabaeidae.)*

By Wm. P. Hayes, and J. W. McColloch, Kansas Agricultural Experiment Station.

During the course of the studies of white grubs in Kansas by the writers, an apparently new species of *Anomala* has been found which is of considerable economic importance. A

*Contribution No. 320 from the Entomological Laboratory, Kansas State Agricultural College. This paper embodies some of the results of Project 100 of the Kansas Agricultural Experiment Station.

description is presented at this time in order that reference can be made to the species in a forthcoming publication on its life history.

Anomala kansana new species.

♂. Color dorsally dark brown to piceous with lateral margins of elytra flavo-testaceous; ventrally fusco-testaceous to rufo-testaceous with faint, greenish metallic lustre; legs rufo-testaceous proximally, piceous distally; antennæ fusco-testaceous. *Size* 11-12.5 mm. long, 5-6.75 mm. wide.

Head piceous with faint purple to æneous iridescence. Labrum concealed dorsally by clypeus. Clypeus strongly reflexed apically, angles broadly rounded, about twice as wide as long, closely and confluently punctured, producing a dense rugosity on disk, less coarsely punctured on caudal margin. Clypeo-frontal suture slightly curved, with tentorial depressions laterally. Front slightly flattened, coarsely and confluently punctured, vertex more sparsely punctured, punctures not confluent, front and vertex with purple to æneous iridescence.

Prothorax unicolorous, piceous to rufo-piceous. Size 5.75 mm. wide, 3.25 mm. long. Surface evenly punctured on disk, punctures larger than those of vertex but sparser, becoming more confluent laterally. Faint median, depressed line anteriorly, in some specimens extending caudad at least half the length of prothorax, in others almost obliterated; near each lateral margin a rather strongly depressed, rounded area; sides evenly and strongly arcuate, converging in apical half of margin; angles rather strongly rounded, posterior pair more rounded than anterior angles. Basal bead entire.

Scutellum semicircular, punctures irregular, about equal in size to those of prothoracic disk, posterior margin impunctate, forming a smooth margin. *Elytra*, in type, piceous with posterior two-thirds to three-fourths of lateral and caudal margins flavo-testaceous, extending slightly anteriorly on suture, varying as noted below, lateral margins subparallel, becoming more rounded apically, punctures on disk strongly rugose. Striæ moderately coarse, deeply impressed and almost confluently punctured, first interval finely and sparsely punctuate; second interval wide and confusedly, rugosely punctate, narrowing toward the apex; in some specimens the punctures form a median sulcus apically; third interval narrow and faintly punctate; fourth interval almost as wide as second and confusedly punctate.

Pygidium, shining, rufo-testaceous, finely and densely punctate, punctures shallow and somewhat arcuate.

Tarsi of posterior legs longer than tibia by length of tarsal claws, femur and tibia about equal. Upper claw of first and second pair cleft, rami equal in length with one ramus slightly stouter in male. In female one ramus slightly shorter and stouter than other ramus.

♀: Differs from male in having the club of antenna shorter than the stem, in the male longer than the stem. The eyes of the female are less prominent and separated by about twice their width, while in the male, eyes are convex and separated by less than twice their width.

Variations. The normal piceous color of the elytra is replaced by spots, splashes or streaks of testaceous coloring.

Systematic position. This species belongs in the *flavipennis* section as defined by Casey (1914)[1] and is closely related to *flavipennis* Burm., but is readily distinguished by its larger size, its darker thoracic coloration and the characteristic markings of the elytra.

Material. Described from 125 specimens. *Type* in the collection of the Kansas State Agricultural College. Paratypes will be deposited in United States National Museum. Described from specimens collected and reared during June and July. Locality, Riley and Clay Counties, Kansas.

A New Lycaenid (Lep.) from the Pacific Coast.

By CHAS. L. FOX, San Francisco, California.

Plebeius shasta comstocki new variety.

Separable from *shasta* and *minnehaha* by the much broader border on the outer margin of the upper side of the primaries in the male, brighter shade of color of the upper side of the female, different ground color and absence of white markings on the under side of both male and female.

♂.—Expanse 23 mm. *Upper side.* Primaries: color purplish blue; broad fuscous border on outer margin with slight ferruginous tinge twice as broad as in *shasta* averaging 2.5 mm. in width; fringes white, inside a narrow black line; black, reniform, discal spot. Secondaries: same color as primaries; fuscous border on outer margin half the width of that on primaries,

[1]Casey, T. L. A Revision of the American species of Rutelinae, Dynastinae and Cetoniinae. Mem. Coleop. VI. 1915. pp. 1-394.

surmounted by row of dull orange lunules, the second from the angle larger and more conspicuous, partially enclosing black spots, followed on outer margin of each by a trace of white scales; fringes white; black discal spot smaller than on the primaries.

Under side. Primaries: color brownish gray (grayish white in *shasta*), bluish tinge at base; black spot near base; small inconspicuous spot above and below discal spot close to costal margin; transverse sinuous row of black spots midway between discal spot and outer margin bending most strongly towards the costal margin; beyond this a less conspicuous row of submarginal spots, followed by a row of still fainter spots becoming obsolete towards the tip; a distinct fine black line at base of fringes; fringes light brown becoming paler outwardly. Spots not distinctly edged with white as in *shasta* and *minnehaha*. Secondaries: same color as primaries; three spots more or less conspicuous near base; discal spot and transverse sinuous row of spots scarcely darker than the ground except large black spot close to costal margin; other margin with a series of round black spots bordered with pale metallic scales, each spot surmounted by a yellow lunule which is again surmounted by a small dark lunule; lacking accompanying row of white triangular spots found in *shasta* and *minnehaha;* fringes and marginal line as in primaries.

♀.—Expanse 23-25 mm. *Upper side.* Primaries: color a brighter reddish brown than in *shasta,* slightly tinged with blue at base; a narrow dark border on outer margin; black discal spot at apex of cell; fringes whitish brown. Secondaries: somewhat darker in color; discal spot inconspicuous; submarginal row of yellow lunules surmounting black spots brighter and more conspicuous than in *shasta.*

Under side. Primaries and secondaries similar to the male except that markings are more conspicuous and ground color brighter, having a slightly yellow hue. The white markings of *shasta* and *minnehaha* wanting.

Described from 26 males and 9 females taken at Glacier Point, Yosemite National Park, California, July 11, 1923, by Mr. J. D. Gunder.

Named for Dr. John A. Comstock, Director of the Southwest Museum, Los Angeles, California.

Type: Male, and *allotype,* female, in the collection of Mr. J. D. Gunder, Pasadena, California. *Paratypes* in the collections of the California Academy of Sciences, San Francisco, the Southwest Museum, Los Angeles, and Mr. J. D. Gunder.

ENTOMOLOGICAL NEWS

PHILADELPHIA, PA., APRIL, 1924.

PROFESSOR JACQUES LOEB.

Professor Jacques Loeb, physiologist and general biologist, who died at Bermuda, February 12, 1924, was widely known as an exponent of mechanistic theories of life. Some of his earliest papers—*Die Orientirung der Tiere gegen die Schwerkraft der Erde (tierischer Geotropismus)*, 1888; *Der Heliotropismus der Tiere und seine Uebereinstimmung mit dem Heliotropismus der Pflanzen*, 1889; *Weitere Untersuchungen über den Heliotropismus der Tiere* u. s. w., 1890—were in part based on results obtained from the caterpillars of *Porthesia chrysorrhaea*, the winged plant lice of *Cineraria*, flies and maggots, establishing in his opinion, his theory of tropisms, recently restated in his book *Forced Movements, Tropisms, and Animal Conduct* (Volume One of the Monographs on Experimental Biology, Philadelphia and London, J. B. Lippincott Co.), 1918. He laid especial emphasis on quantitative experiments in biology and held that these methods lead to the theories which he advocated and oppose those of "trial and error" or of "physiological states." He sought also to extend the tropistic explanation to the instincts of insects, including the complicated actions of an *Ammophila* in provisioning her nest. In the Introduction to the last quoted volume, he wrote:

> Motions caused by light or other agencies appear to the layman as expressions of will and purpose on the part of the animal, whereas in reality the animal is forced to go where carried by its legs. For the conduct of animals consists of forced movements. . . . . .
>
> The idea that morphological and physiological symmetry conditions in an animal are the key to the understanding of animal conduct demanded that the same principle should explain the conduct of plants, since plants also possess a symmetrical structure. The writer was able to show that sessile animals behave toward light exactly as do sessile plants; and motile animals like motile plants. The forced orientations of plants

by outside sources of energy had been called tropisms; and the theory of animal conduct based on the symmetrical structure of their body was, therefore, designated as the *tropism theory of animal conduct.*

Prof. Loeb was born in Germany, April 7, 1859, received the M.D. at Strassburg in 1884 and, after assisting in Physiology at the Universities of Würzburg and Strassburg and the Biological Station at Naples, came to Bryn Mawr College as Associate in Biology in 1891. He was successively Assistant Professor, Associate Professor and Professor of Physiology and Experimental Biology at the University of Chicago, 1892-1902; Professor of Physiology at the University of California, 1902-10, and Head of the Department of Experimental Biology, Rockefeller Institute for Medical Research, New York, from 1910 to his death. Titles of many of his publications are included in the list of Literature appended to his volume on Forced Movements.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE

An Entomologist at Law.

An unusual case of particular interest to the grain trade was decided in the United States District Court at Baltimore recently. In August, 1922, Raymond Carr consigned from the Eastern Shore of Maryland a cargo of wheat to Baltimore grain commission merchants on board the schooner Helen. When the wheat arrived at the Western Maryland Railroad elevator it was found to be heavily infested with weevil and the elevator company refused to allow it to be unloaded into its house until it had been treated for the eradication of the insects.

Dr. John G. Beck, specialist in treating grain infested with bugs, treated the wheat with carbon bisulphide. An explosion followed the use of the chemical, causing the seams of the vessel to expand, after which it sank, resulting in the loss of both boat and cargo.

The shipper entered suit against the commission merchants and Dr. Beck. Judge Soper ruled that Dr. Beck was negligent and that he was liable to the plaintiff for the loss of the vessel. —*Public Ledger,* Philadelphia, January 31, 1924.

The Monument to J. Henri Fabre.

A committee has been formed to continue the subscription opened in 1914 (see the NEWS for July of that year, page 321) to celebrate the centenary of the great *savant* and to erect a monument to him at Sérignan. The public subscription is under the patronage of President Millerand; Premier Poincaré and M. Leon Bérard, Minister of Public Instruction and Fine Arts, are among the honorary presidents, while the honorary committee includes M. L. Mangin, director of the National Museum of Natural History, Dr. G. V. Legros, biographer of Fabre, Prof. Bouvier and others. Subscriptions should be sent by check or postal order to M. Henry de la Paillonne, Maire de Sérignan, Vaucluse, France.

A New Form of Rhynchites (Coleop.: Curculionidae).

The red rose weevils, which have been known as *Rhynchites bicolor* Fab., were shown some years ago to present several distinct races. Pierce (1913) recognised *bicolor* Fab., *cockerelli* Pierce, *ventralis* Pierce, *wickhami* Ckll., *piceus* Pierce and *viridilustrans* Pierce. Green (1920) showed that *wickhami* had additional characters to those previously recorded, and there seemed to be reason for considering it a distinct species, peculiar to the western part of the country. We now have an additional form, taken at Boulder, Colorado, on roses, which differs from all the others in being entirely red except the beak (which has the base red, or may be practically all black), the knees, and the ends of the tibiae and of the tarsal joints; or the sides of mesothorax and base of abdomen may be blackened. The sculpture of the elytra is practically as in *wickhami*, but the thorax resembles that of *bicolor* in form, instead of being strongly convex at the sides as in *wickhami*. In *wickhami* the front is nearly bare of pubescence, in *bicolor* and the new form the front is conspicuously pubescent. Two specimens of the new form were taken, one several years ago (Cockerell), the other July 8, 1923 (Harris.) The new form may be designated *Rhynchites bicolor erythrosoma*. — T. D. A. COCKERELL and R. C. HARRIS, Boulder, Colorado.

Cleanup Week in Pennsylvania.

Cleanup Week will be observed throughout the state during the week beginning April 14, 1924. Appeals are being sent to the officials of every city, borough, community and hamlet in the state by the officials of the state departments of health, forest and waters and state police to prepare for the most intensive cleanup period that Pennsylvania has ever witnessed.

The cleanup efforts this year will not be confined to the settled portions of the state. In the more remote vicinities, forest wardens, state police and health officers will direct the crusade to eliminate dirt, fire hazards and conditions that menace the public health. Especial attention will be devoted to breeding spots for flies. The avowed aims of the state wide drive are announced as health protection, fire protection and forest protection. A later date is not advisable, it is explained, because the intent of the drive is to eliminate the fly breeding spots before the first spring flies deposit their eggs.

A program providing for a certain type of cleanup work on each day of the week has been formulated by the state officials in charge of the drive. Wednesday is fly and mosquito day. Cesspools, stables, pig pens, chicken coops, stagnant pools and garbage cans are to receive the attention of the citizen cleanup army on that day.

Entomological Literature

COMPILED BY E. T. CRESSON, JR., AND J. A. G. REHN.

Under the above head it is intended to note papers received at the Academy of Natural Sciences, of Philadelphia, pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

The numbers in **Heavy-Faced Type** refer to the journals, as numbered in the following list, in which the papers are published.

All continued papers, with few exceptions, are recorded only at their first installments.

Papers of systematic nature will be found in the paragraph at the end of their respective orders. Those containing descriptions of new genera and species occurring north of Mexico are preceded by an *.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

The titles occurring in the Entomological News are not listed.

1—Proceedings of the Academy of Natural Sciences of Philadelphia. **4**—Canadian Entomologist, Guelph, Canada. **5**—Psyche, Cambridge, Mass. **8**—The Entomologist's Monthly Magazine, London. **9**—The Entomologist, London. **10**—Proceedings of the Entomological Society of Washington, D. C. **11**—Annals and Magazine of Natural History, London. **12**—Journal of Economic Entomology, Concord, N. H. **19**—Bulletin of the Brooklyn Entomological Society. **28**—Entomologisk Tidskrift, Uppsala. **50**—Proceedings of the United States National Museum. **52**—Zoologischer Anzeiger, Leipzig. **54**—Proceedings of the Biological Society of Washington, D. C. **57**—Biologisches

Zentralblatt, Leipzig. **59**—Journal of Agricultural Research, Washington, D. C. **68**—Science, Garrison on the Hudson, N. Y. **69**—Comptes Rendus, des Seances de l'Academie des Sciences, Paris. **76**—Nature, London. **77**—Comptes Rendus des Seances de la Societe de Biologie, Paris. **94**—The American Journal of Science, New Haven, Conn. **96**—Physis. Revista de la Sociedad Argentina de Ciencias Naturales, Buenos Aires. **104**—Zeitschrift fur Wissenschaftliche Zoologie, Leipzig. **108**—Journal of Genetics, Cambridge, England. **114**—Entomologische Rundschau, Stuttgart. **115**—Societas Entomologica, Stuttgart. **118**—Die Naturwissenschaften, Berlin. **141**—Internationale Entomologische Zeitschrift, Guben, Germany. **144**—Proceedings of the Pacific Coast Entomological Society, San Francisco. **155**—Stanford University Publications. Biological Sciences.

GENERAL. Blaisdell, F. E.—[as secretary editing the minutes of the meetings: many notes on insects of the Pacific States]. **144,** ii, 15-32. **Bryk, F.**—Bibliographia Chr. Aurivilliana **28,** 44, 3-56 [1871-1922, 216 titles]. **Cook, W. C.**—The distribution of the pale western cutworm: a study in physical ecology, (Ecology, Brooklyn, New York, v, 60-69). **Dunbar, C. O.**—Kansas permian insects. Pt. 1. The geologic occurrence and the environment of the insects. **94.** vii, 171-209. **Durck, H.**—Sammel und Tötungezylinder aus Celluloid. **114,** xli, Nr. 1, 3-4. **Franck, G.**—Obituary note. **19,** xix, 1-3. **Graham, S. A.**—Forest entomological problems in the Lake States, (Journal of Forestry, Washington, xxii, 24-28.) **Haldane, J. B. S.**—A mathematical theory of natural and artificial selection. (Trans. Cambr. Phil. Soc., xxiii, 19-41.) **Howard, L. O.**—Address of the retiring president. On entomological societies. Insect parasites of insects. **10,** xxvi, 25-46. **Howes, P. G.**—Fungus diseases that destroy insects. (Nature Magazine, Washington, iii, 151-2, 158.) **International Commission** on Zoological Nomenclature Opinions rendered 78-81 (Smithsonian Miscellaneous Collections, Washington, D. C., lxxii, No. 2.) **Johannsen, O. A.**—External insect anatomy. By A. D. MacGillivray. **68,** lix, 214-5. **Porter, C. E.**—Breve reseña acerca de la contribucion de los zoologos italianos al conocimento de la fauna de Chile (Actas, Societe Scientifique du Chili, xxxi, 136-143.) **Schroder, C.**—Handbuch der entomologie. Lief. 11-12 (Bd. iii, p. 657-848). **Seitz, A.**—Verkehr und entomologie. **114,** xli, 5-6 (Cont.) **Strand, E.**—Bitte um einsendung von auto-

biographien. **52,** lviii, 56-7. **Swinhoe, C.**—Obituary. **8,** 1924, 19-20. **Townsend, C. H. T.**—An analysis of insect environment and responses. (Ecology, Brooklyn, New York, v, 14-25.) **Tragardh, I.**—Mal och medel inom skogs-entomologien, Ziele und Wege in der Forstentomologie [Resumée in German]. (Meddelanden fran Statens Skogsforsoksanstalt, Stockholm, xx, 209-240, 1923.)

ANATOMY, PHYSIOLOGY, MEDICAL, ETC. Blunck & Speyer.—Kopftransplantation bei Insekten 1. Beilage zum Jahrebericht für 1924 des Naturwissenschaftl. Vereins in Naumburg a. S., 4 pp. **Eidmann, H.**—Das sogenennte "Praemaxillare" der insekten. **52,** lviii, 43-52. **Gauthier, H.**—Sur la presence d'Ochtebius (Hydrophilidae) dans les salines du Chott el Djerid, en Tunisie. Bulletin, Sociéte d'Histoire Naturelle de l'Afrique du Nord, Algers, xiv, 346-7. **Glaser, R. W.**—The relation of microörganisms to the development and longevity of flies. (Amer. Journ. Trop. Med. IV, 85-107.) **Legendre, J.**—Des variations dans le tropisme des Culicides. **69,** T. 128, 423-425. **de Luna.**—Sur la participation d'une peroxydase à l'apparition du pigment chez la Drosophila melanogaster Loew, **69,** T. 178, 525-527. **Muttkowski, R. A.**—Studies on the blood of insects. The structural elements of the blood. **19,** xix, 4-19.

ARACHNIDA AND MYRIOPODA. Hanstrom, B.—Ueber die histologie und vergleichende anatomie der sehganglien und globuli der araneen. (Kungl. Svenska Vet.-Akad. Handl., lxi, N. 12, 39 pp.) **Kastner, A.**—Die vergleichend anatomische bedeutung der interpulmonarfalte der araneen. **52,** lviii, 97-102.

Carbonell, J. J.—Algunos Datos sobre las arañas del genera Latrodectus. Una nueva especie de scorpion. **96,** vi, 350-353; 358. ***Chamberlin, R. V.**—Descriptions of new American and Chinese spiders, with notes on other Chinese species. **50,** lxiii, art. 13.

THE SMALLER ORDERS OF INSECTA. Alverdes, F.—Beobachtungen an Ephemeriden- und Libellenlarven. **57,** xliii, 577-605. **Baldus, K.**—Untersuchungen über Bau und Funktion des Gehirnes der Larve und Imago von Libellen. **104,** cxxi, 557-620. **Dietz & Snyder, T. E.**—Biological notes on the termites of the Canal Zone and adjoining parts of the Republic of Panamą. **59,** xxvi, 279-302. **Howe, R. H., Jr.**—Williamsonia lintneri (Hagen), its history and distribution.

5, xxx, 222-225. ***McDunnough, J.**—New Ephemeridae from Illinois. **4,** lvi, 7-9. **Shafer, G. D.**—The growth of dragonfly nymphs at the moult and between moults. **155,** iii, 307-37. **Snyder, T. E.**—Note on mating flight of Hexagenia bilineata (Plectoptera) **10,** xxvi, 24.

***Clemens, W. A., & Leonard, A. K.**—On two species of mayflies of the genus Heptagenia. **4,** lvi, 17-18. **Snyder, T. E.**—A new subg. of Nasutitermes (Isoptera). **10,** xxvi, 20-4. An extraordinary new Rhinotermes from Panama. **54,** xxxvii, 83-6. **Tillyard, R. J.**—Kansas permian insects. Decription of a new Paleodictyopterid. **94,** vii, 203-8.

ORTHOPTERA. Heikertinger, F.—Was leistet das kontinuitatsprinzip in der nomenklatur. Der fall Locusta-Phasgonura-Tettigonia als nomenklatorisches schulbeispiel. **52,** lviii, 115-34.

MacCurdy, H. M.—Orthoptera from Gratiot County, Michigan. (Papers of the Michigan Academy of Science, Arts and Letters, ii, 215-220.) **Uvarov, B. P.**—Revised lists of species of the genera Arcyptera, Mecostethus and Ramburiella (Acrididae). **11,** (9) xiii, 242-248.

HEMIPTERA.—Anon.—[Review of] A Biology of the British Hemiptera Heteroptera by E. A. Butler, London, H. F., & G. Witherby, 1923, 63 shillings. **76,** cxiii, 156. **Dunn, L. H.**—Life history of the tropical bedbug, Cimex rotundatus, in Panama. (Amer. Journ. Trop. Med. iv, 77-83.) **Lacroix, D. S.**—Notes on the Cape Cod brood of periodical cicada during 1923. **5,** xxx, 203-206. **Parshley, H. M.**—A controversial note on some species of Lygaeus (Lygaeidae). **4,** lvi, 18-19. **Readio, P. A.**—Notes on the life history of a beneficial reduviid, Sinea diadema. **12,** xvii, 80-6. **Runner & Bliss.**—The three-banded grape leafhopper and other leafhoppers injuring grapes. **59,** xxvi, 419-24. **Takahashi, R.**—On the nymphs of the Aphidinae. **10,** xxvi, 1-11. **Van Duzee, E. P.**—A new Ceratocombid from Mexico. **144,** ii, 33-34. **Van Duzee & Burke.**—Trackykele. **144,** ii, 21-24.

***Annand, P. N.**—A new Chermes from pine (Aphidae). **4,** lvi, 5-6. **Blanchard, E. E.**—Aphid notes pt. III. Argentine species of the subtribes Pentalonina and Aphidina. **96,** vi, 43-58. **Chamberlin, J. C.**—Classification and geographical distribution of the Tachardiinae of the Coccidae. **144,** ii, 27-28. **Ewing, H. E.**—Our only common North American chigger, its distribution and nomenclature. **59,** xxvi,

401-3. **Lizer, C.**—Tres coccidos nuevos para la fauna argentina. **96,** vi, 99-100. **Lizer, C.**—Notas sobre tres especies del genero Dactylopius (Coccidae) halladas en el pais. **96,** vi, 106-111. **Muir, F.**—Notes on some genera of Derbidae. **10,** xxvi, 15-9. **Pennington, M. S.**—Hemipteros nuevos para la republica Argentina. **96,** vi, 315-319.

LEPIDOPTERA. Baylis, H. A.—Colour-production in Lepidoptera, (cont.). **9,** lvii, 29-34. **Blanchard, E. E.**—Apuntes sobre Zophodia analamprella Dyar y otros Lepidopteros que viven sobre Cactaceas en la Argentina. **96,** vi, 119-123. **Corti, A.**—Studien über die Gattung Agrotis O. I. Ueber Kataplexie bei Agrotisarten. **115,** xxxix, Nr. 2, 1-2. **Cottle, J. E.**—[Catocala at Anderson's Springs, Lake County, Calif.]. **144,** ii, 16. **Flessa, L.**—Ist die Einbürgerung von Philosamia cynthia in Deutschland möglich? **141,** xvii, 147. **Gibson, A.**—The occurrence of the tortricid, Cacoecia rosana in Canada. **12,** xvii, 51-4. **Gillott, A. G. M.**—Peregrinatory flights of Lepi. in Costa Rica. **9,** lvii, 45-6. **Glick, P. A.**—The cottonwood leaf miner (Proleucoptera albella Cham.) The survey of Myelois venipars Dyar in Arizona. (14th Ann. Rept. Arizona Comm. Agric. & Hortic., Phoenix, Ariz., 1923, 68-73, 78-97.) **Harrison, J. W. H.**—The inheritance of wing color and pattern in the Lepidopterous genus Tephrosia (Ectropis) with an account of the origin of a new allelomorph. **108,** 13, 333-352. **Hering, M.**—Anatomischer befund eines witters von Argynnis paphia. **52,** lviii, 74-81. **Kieper, A.**—Interessantes von Pyrameis cardui L. **141,** xvii, 145-6. **Musgrave, A.**—Some caterpillars injurious to man. (Australian Mus. Mag., ii, 34-6.)

Barnes & Benjamin.—On the synonymy of the monarch butterfly (Danaidae). **4,** lvi, 16. ***Barnes & Benjamin.**—A new Oiketicus from Texas. (Psychidae). **19,** xix, 24-5. **v.Dalla Torre, K. W.**—Lepidopterorum catalogus. Pars. 29. Cossidae. **Kruger, E.**—Beitrage zur kenntnis der columbischen Satyriden. **114,** xli, 7. (Cont.)

DIPTERA. Bruch, C.—Observaciones biologicas acerca de Salpingogaster nigriventris Bigot (sirfido). **96,** vii, 1-6. **Bodenheimer, F.**—Beiträge zur Kenntniss der Kohlschnake (Tipula oleracea L.) Zur Anatomie und Oekologie der Imago. **104,** cxxi, 393-441. **Cockerell, T. D. A.**—Earthworms and the cluster fly. **76,** cxiii: 193-4. **Cole, F. R.**—[Diptera at Sunol, on San Antonio Creek, Calif.]. **144,** ii, 29-30.

Copello, A.—Biologia de Mallophora ruficauda (Wied.) **96,** vi, 30-42. **Grassi, B.**—Razze biologiche differenti di Culex pipiens. (Rendiconti, Reale Accademia Nazionale dei Lincei, Rome, Classe di Scienze fis., mat. e nat., xxxii, 457-464.) **Jones & Bradley.**—Further observations on Tabanidae in Louisiana. **12,** xvii, 45-50. **Keilin, D.**—On the nephrocytes in the larvae and pupae of Lonchaea chorea F. (Acalypterae). **11** (9) xiii, 219-223. **Leiby & Hill.**—The twinning and monembryonic development of Platygaster hiemalis, a parasite of the Hessian fly. **59,** xxv, 337-349. **Mercier, L.**—L'atrophie des muscles du vol après la chute des ailes chez Lipoptena cervi L. (Dip. pupipare). **69,** clxxviii, 591-4. **Nitzulescu, V.**—Sur l'ingestion du bleu de methylene par Stomoxys calcitrans. **77,** xc, 155-6. **Tragardh, I.**—Skogsentomologiska Bidrag II [Chilosia] [Summary in English]. (Meddelanden från Statens Skogsförsöksanstalt, Stockholm, xx, 401-424, 1923.

Blanchard, E. E.—Apuntes sobre dos dipteros argentinos. **96,** vi, 319-323. ***Cresson, E. T. Jr.**—Records of some western Diptera, with descriptions of two new species of the family Bombyliidae. **1,** lxxv, 365-367. ***Curran, C. H.**—The generic position of Beris viridis Say (Stratiomyidae). **4,** lvi, 24. ***Hine, J. S.**—The North American sp. of the gen. Meromacrus, with one new sp. (Syrphidae). **19,** xix, 20-3. ***Malloch & McAtee.**—Flies of the family Drosophilidae of the District of Columbia region. . . **54,** xxxvii, 25-42. ***Melander, A. L.**—Studies in Asilidae. **5,** xxx, 207-219. ***Spuler, A.**—North American genera and subgenera of Dipterous family Borboridae. **1,** lxxxv, 369-378.

COLEOPTERA. Brooks, F. E.—Oak sapling borer, Goes tessellatus Haldeman. **59,** xxvi, 313-317. **Bruch, C.**—Coleopteros fertilizadores de Prosopanche burmeisteri De Bary. La forma femenina de Castanochilus bruchianus Ohs. **96,** vii, 82-88; 115-119. **Chittenden, F. H.**—Distribution of Epilachna corrupta. **19,** xix, 3. **Dallas, E. D.**—Sobre dos anomalias en coleopteros remitidos por el señor Tremoteras, de Montevideo. **96,** vi, 356-357. **Frers, A. G.**—Metamorfosis, biologia y variaciones de una especia de Crisomelido, Lema dorsalis (Oliv.) **96,** vi, 1-21. **Frers, A. G.**—Metamorfosis de coleopteros argentinos. Algunas monstrosidades en coleopteros. **96,** vi, 254-262; 347. **Frost, C. A.**—Agrilus viridis in Massachusetts. **19,** xix, 27. **De Garnett.**—[Coleoptera on San Antonio Creek near Sunol, Calif.]. **144,** ii, 19. **Lizer, C.**—Dos palabras acerca de una variedad

del Coccidophilus citricola Bthes. **96,** vii, 54-55. **Snyder, A. F.**—Importance of the White Pine Weevil. (Forest Leaves, Philadelphia, Pa., xix, 109-110.) **Spessivtseff, P.**—Bidrag till kannedomen om bruna oronvivelns (Otiorrhynchus ovatus L.) morfologi och biologi. [Resumée in German.] Meddelanden fran' Statens. Skogsförsöksanstalt, Stockholm, xx, 241-260. 1923). **Tragardh, I.**—[Pissodes, Orchestes, (see Diptera)]. **Van Dyke, E. C.**—[Coleoptera of Oregon and California]. **144,** ii, 16-19. **Wallace, G.**—[Coleoptera in the vicinity of Lake Tahoe, California]. **144,** ii, 15-16, 19.

Bernhauer, M.—Coleopterologische Beiträge. [Nn. spp. Oligota from the Antilles.] **28,** 44, 141-6. ***Blaisdell, F. E.**—Two new species of Melyridae from California and one from British Columbia, including two new genera. **4,** lvi, 1-5. ***Dawson, R. W., & McColloch, J. W.**—New species of Bolbocerosoma (Scarabaeidae). **4,** lvi, 9-15. **Dury, C.**—Note on Anamorphus. **19,** xix, 25. ***Fisher, W. S.**—A new sp. of Brachys from Arizona. (Buprestidae). **10** xxvi, 12-3. **Pic, M.**—Melanges exotico-entomologiques. Fasc. 39-40.

HYMENOPTERA. Baumann, C.—Ueber den bau des abdomens und die funktion des lege-apparates von Thalessa leucographa. **52,** lviii, 149-62. **Bruch, C.**—La reina de una hormiga legionaria Eciton dulcius For. var, jujuyensis Forel; costumbres de las obreras y mirmecofilos de las mismas hormigas. Costumbres y nidos de hormigas. **96,** vi, 105; 118. **Frühauf, E.**—Legeapparat und Eiablage bei Gallwespen (Cynipiden). **104,** cxxi, 656-723. **Kuhn, A.**—Zum nachweis des farbenunterscheidungsvermogens der bienen. **118,** vi, 116-8. **Johnson, C. W.**—Notes on the nests of Odynerus (Ancistrocerus) birenimaculatus Saussure. **5,** xxx, 226-7. **Plath, O. E.**—Notes on the egg-eating habit of bumble bees. **5,** xxx, 193-202. **Rau, P.**—A note on the nesting habits of Tachytes distinctus Sm. **5,** xxx, 220. **Toedtmann, W.**—Die spermtozoen von Formica rufa. **52,** lviii, 52-5. **Tragardh, I.**—[Lyda, Trichogramma (see Diptera)].

***Malloch, J. R.**—A new sp. of the gen. Brachycistus (Aculeata). **19,** xix, 23. **Schmiedeknecht, O.**—Opuscula ichneumonologica. Fasc. 38. (p. 2963-3042). ***Viereck, H. L.**—Descriptions of two Canadian bees of the genus Melecta; *Prodromus of Andrena, a genus of bees. **4,** lvi, 15; 19-24. ***Viereck, H. L.**—The identity of Conohaltictoides novaeangliae. **10,** xxvi, 14-5. **Wheeler, W. M.**—Ants of the genera Myopias and Acanthoponera. **5,** xxx, 175-192.

SPECIAL NOTICES

Bibliographia Zoologica.—Vol. 33 of this work has just been received. Pages 393-473 include the Insecta. For the most part the references are for the years 1917 to 1921, but several titles appearing before and after these dates are cited.

Macrolepidoptera of the World.—Parts 314-317 have just appeared (English edition). Part 314 contains Fauna americana Pt. 132, Genera Paeudalpia to Psychomorpha. By M. Draupt. The other parts contain Fauna indoaustralica.

Opuscula Ichneumonologica.—Herausg. von O. Schmiedeknecht. Fascicle 38 of this long interrupted work. The last previous part was issued in 1914. This part includes pages 2963 to 3042.

OBITUARY.

The death of Colonel CHARLES SWINHOE on December 2, 1923, at Avonmore, West Kensington, London, is announced in the English journals. He was born August 29, 1836, and served in the Indian Army for more than thirty years, accompanying Lord Roberts on the march to Kandahar. Becoming interested in the birds and Lepidoptera of India, he published a number of volumes on the latter, among them *Catalogue of the Moths of India* (in collaboration with E. C. Cotes, Calcutta, 1887-9), the completion of *Lepidoptera Indica* (after the death of Dr. Frederic Moore), *Catalogue of Eastern and Australian Lepidoptera-Heterocera of the Oxford University Museum* (2 vols., 1892, 1900) and *A Revision of the Genera of the Family Liparidae* (Ann. & Mag. Nat. Hist., 1923 and earlier years). For more than the last thirty years he lived in Oxford and in London. Ent. Mo. Mag., Jan., 1924; Nature, Jan. 5, 1924).

The Rev. Canon THEODORE WOOD died at Wondsworth Common, England, December 13, 1923. He was the son of the Rev. J. G. Wood, author of numerous, well known, popular books on natural history, was born August 6, 1862, and himself the writer of *Our Insect Allies, Our Insect Enemies* and of notes on British Coleoptera. (Ent. Mo. Mag., Jan., 1924;) Nature, Jan. 5, 1924).

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and only when necessary those at the top (being longest in) are discontinued.

Endomychidae. I desire to purchase representatives of this family from any part of the world. Particularly desire specimens from the western and southwestern part of the U. S. L. B. Walton, Kenyon College, Gambier, Ohio.

Buprestidae, Cleridae and **Carabinae** wanted from U. S. or Buprestidae of the world. Will collect insects of any group (except Lepidoptera) in exchange or pay cash. Alan S. Nicolay, 416a Grand Ave., Brooklyn, New York.

Lepidoptera. Hesperiidae (Skipper-butterflies). Will purchase, exchange or name specimens. North or South America. Pamphila comma group particularly desired. Henry Skinner and R. C. Williams, Jr., Address Academy of Natural Sciences, Logan Square, Philadelphia, Pa.

Lepidoptera-Noctuidae. Will purchase or exchange moths of this family for western lepidoptera. Chas. A. Hill, P. O. Box 653, Glendale, Cal.

Wanted—Ants from all portions of the United States for determination or exchange. Will also exchange other insects for ants. M. R. Smith, Assistant Entomologist, State Plant Board, A. and M. College, Miss.

Wanted in exchange or cash 1000 Precis orithya ♂, Precis isocratia ♂, Precis mevaria ♂. A. F. Porter, 104 W. Broadway, Decorah, Iowa.

Cynipidae. Galls and bred wasps wanted to determine or in exchange. Alfred C. Kinsey, Indiana University, Bloomington, Indiana.

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For Exchange.—I have for exchange live pupae of Sphinx Chersis, for other pupae or Lepidoptera in papers, Southern specimens. V. Tykal, 2412 S. Harding Ave., Chicago, Ill.

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Wanted—Psyche, Vols. I, XI, XIII, and Bulletin, Brooklyn Entomological Society, Vols. I, II, III. H. C. Severin, State Entomologist, Brookings, South Dakota.

I have living pupae of io, imperialis, regalis and others, also caterpillars of Eupantheria deflorata and spp. of Coleoptera for exchange. Address V. Harnach, 47 West College St., Asheville, N. C.

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